

Radar Colors – What do they Mean?

-by Ted Jamba/Radar Focal Point

On the internet, our radar displays many different colors. This article is your guide on how to interpret them and know what is occurring throughout your area. The radar that covers northeast Montana is always in operation and has had very little down time due to failure. Over the past year, the radar has only failed for a total of 6.25 hours.

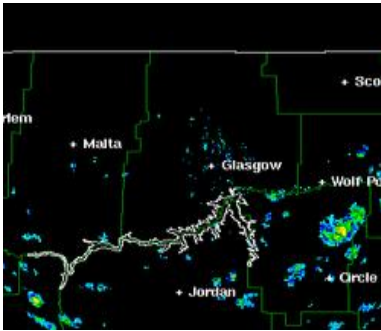


Figure 1. Precipitation Mode

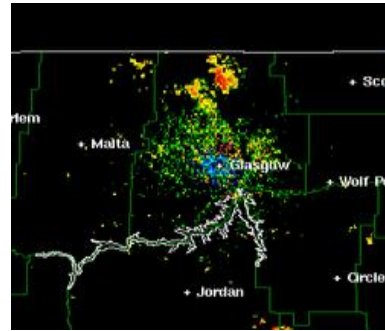


Figure 2. Clear Air Mode

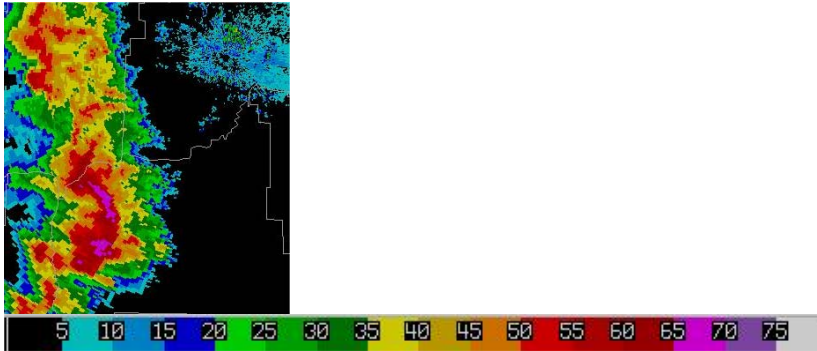
Figure 1 is a snapshot of the radar (from the internet) showing a rain shower on the right (between Circle and Wolf Point). The colors are different than what is seen in Figure 2, but the echo in Figure 1 is more intense. They are showing the base reflectivity, which refers to the lowest level of the storm that the radar is looking at. If it were a composite reflectivity image, it would be showing the most intense portion of the storm throughout all the levels that the radar beam is looking at.

The WSR-88D radar in Glasgow has two operational modes; one for precipitation and one for little or no precipitation. On the internet, when the radar echoes are yellow, red and occasionally white, the radar is running in “Clear-Air Mode.” In Figure 1, the blues, greens and yellow indicate that the radar is operating in “Precipitation Mode.” If you are lucky (and you’re looping the images), you’ll see the same echoes change colors when the radar switches from one mode to another.

There are several reasons for the radar to have these two modes of operation, one of them being to save on wear and tear of the system. The majority of the time the radar is run in “Clear-Air Mode” because we do not have precipitation occurring. It runs at a slower pace and scans just 5 elevation slices in the atmosphere. In this mode, many of the echoes in yellow and red represent clouds. Dark red and white echoes sometimes indicate light precipitation is occurring.

When heavy rain or snow, or thunderstorms are expected, the radar is put into “Precipitation Mode.” Computer algorithms generate a suite of products when the radar is in this mode, to help forecasters issue severe weather warnings, mainly for severe thunderstorms and tornadoes. In this mode, the radar spins a bit faster and looks at many more elevation slices through the atmosphere. The radar is able to estimate things like the size of hail that falling from a thunderstorm, or give an approximation of wind speeds. Computer generated alerts are even sent to the forecasters to apprise them of

storms that are becoming strong. When you see really bright colors in this mode, it is an indication that the particles the radar beam is reflecting off of are fairly large. It could be large raindrops, big snowflakes or even hail.



The above photo shows a thunderstorm in western Garfield County with bright pink in the center. If you look at the scale with the photo, it shows the bright pink in the 65-70 range. Radar returns are measure in Dbz (Decibel of reflectivity)) so this storm has a 65-70 Dbz intensity. That is pretty strong for our area, and oftentimes when storms get that intense, the NWS will issue a warning for it.

The radar can also measure which way things are moving, and how fast they are moving. This is referred to as velocity data. The image below shows the base reflectivity and storm relative motion data of a thunderstorm in southern Valley County. We know the storm is fairly intense because of the dark red and white in the photo on the left. The photo on the right is showing us how things are moving within the storm. The radar at Glasgow is the little black circle in the upper right hand corner of the image. Where you see green, it means the particles in the atmosphere are moving towards the radar. The red is moving away from the radar. Just to the west of the Pines Recreation Area you can see the red and green intermixing. This is showing an area of rotation, which the forecasters at WFO Glasgow issued a tornado warning on. In the reflectivity image, there is an appendage that appears in the same area as the red and green swirl. We refer to this as a “hook echo.” These are classic signs of a tornadic thunderstorm.

